UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

ECOLOGICAL SITE DESCRIPTION

ECOLOGICAL SITE CHARACTERISTICS

Site Type: Rangeland

Site Name: Limy

Site ID: R042XB019NM

Major Land Resource Area: 042 - Southern Desertic Basins, Plains, and Mountains

Physiographic Features

This site occurs on gently sloping to undulating piedmont slopes, drained lake beds, or alluvial fans. Slopes range to 15 percent but usually average less than 5 percent. Elevations range from about 3,800 to 5,00 feet.

Land Form:
(1) Alluvial flat
(2) Flood plain

	Minimum	Maximum
Elevation (feet):	3800	5000
Slope (percent):	1	15
Water Table Depth (inches):	N/A	N/A
Flooding:		
Frequency:	None	None
Duration:	None	None
Ponding:		
Depth (inches):	N/A	N/A
Frequency:	None	None
Duration:	None	None
Runoff Class:	Low	High
Aspect:	No Influence on this site	

Climatic Features

Annual average precipitation ranges from 8 to 10.5 inches. Wide fluctuations from year to year are common, ranging from a low of about 2 inches to a high of over 20 inches. At least one-half of the annual precipitation comes in the form of rainfall during July, August, and September. Precipitation in the form of snow or sleet averages less than 4 inches annually. Average annual air temperature is about 61 degrees F. Summer maximums usually exceed 100 degrees F., and winter minimums can go below zero. The average frost-free season exceeds 200 days and extends from April 1 to November 1. Both the temperature regime and rainfall distribution favor warm-season perennial plants on this site. Spring moisture conditions are only occasionally adequate to cause significant growth during this period of the year. High winds from the west and southwest are common from March to June, which further tends to create poor soil moisture conditions in the springtime.

	Minimum	Maximum
Frost-free period (days):	179	212
Freeze-free period (days):	200	233
Mean annual precipitation (inches):	8.0	10.5

Monthly precipitation (inches) and temperature (°F):

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Precip. Min.	0.37	0.36	0.23	0.18	0.29	0.57	1.42	1.92	1.53	1.01	0.48	0.57
Precip. Max.	0.54	0.39	0.27	0.36	0.45	0.64	1.9	2.2	1.66	1.07	0.58	0.78
Temp. Min.	20.8	25.5	31.2	38.0	46.4	54.3	61.1	59.1	51.5	39.8	28.8	22.3
Temp. Max.	58.1	63.8	71.0	79.3	87.4	96.4	95.5	92.7	87.5	78.7	67.2	58.8

Climate Stations:
(1) NM3855, Hatch. Period of record 1961 - 1990
(2) NM8387, Socorro. Period of record 1961 - 1990

Influencing Water Features

This site is not influenced by water from wetlands or streams.

Wetland Description:	System	Subsystem	Class
(Cowardin System)			

Representative Soil Features

The soils of this site are usually shallow and well drained. Typically, the surface layer is a calcareous fine sandy loam and silty clay loam to clay loam containing less than 35 percent gravel and underlain within 20 inches by a very strongly calcareous layer that may be weakly cemented. They have moderately slow permeability. Runoff is slow to medium

Predominant Parent Materials:
Kind: Marine deposits
Origin: Mixed-calcareous

Surface Texture:	(1)	Fine sandy loam
	(2)	Silty clay loam
	(3)	Clay loam
Subsurface Texture Group:		Loamy
Surface Fragments <=3" (% Volume):		5
Surface Fragments > 3" (% Volume):		0
Subsurface Fragments <=3" (% Volume):		11 - 35
Subsurface Fragments > 3" (% Volume):		0
Drainage Class:		Moderately well drained To Well drained
Permeability Class:		Moderate To Slow

	Minimum	Maximum
Depth (inches):	0	24
Electrical Conductivity (mmhos/cm):	0	4
Sodium Absorption Ratio:	N/A	N/A
Calcium Carbonate Equivalent (percent):	N/A	N/A
Soil Reaction (1:1 Water):	7.4	9.0
Soil Reaction (0.01M CaCl2):	N/A	N/A
Available Water Capacity (inches):	2.0	7.0

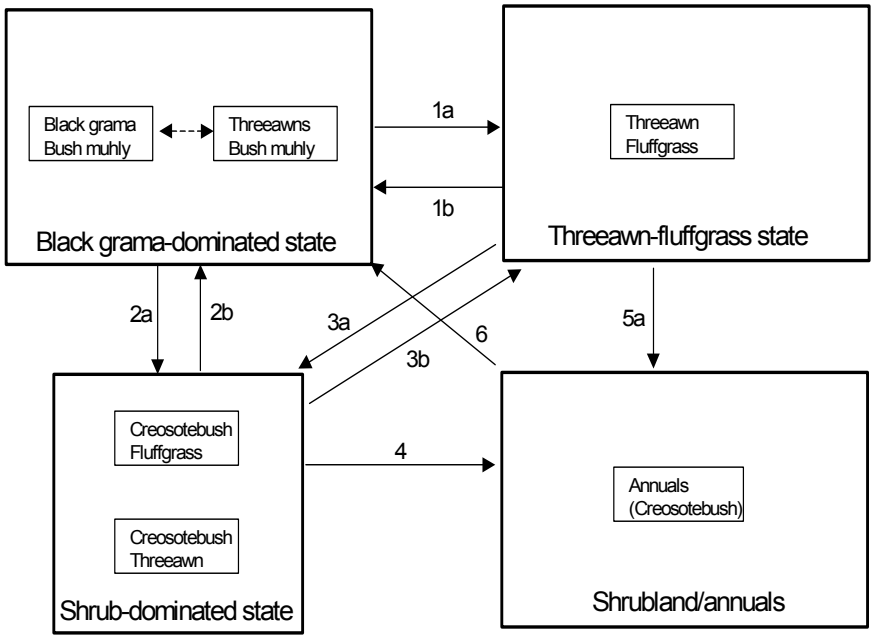
Plant Communities

Ecological Dynamics of the Site

Overview

This ecological site is associated with gravelly and loamy ecological sites. Limy sites are uncommon in SD-2. The principal ecological feature separating this site from sandy and loamy sites is the high amount of calcium carbonate throughout the profile and the presence of a white, calcareous horizon within 10-20". The high levels of calcium carbonate may reduce infiltration rates and inhibit the uptake of some nutrients (e.g. phosphorus; Lathja and Schlesinger 1988) so this site may be more stressful than sites of similar texture, and more easily subject to degradation. On the other hand, water that does penetrate may be held in the soil for longer periods than in soil of similar texture without high carbonate levels. In any case, the authors have been unable to locate limy soils harboring grassland. The historic plant community type is assumed to exhibit dominance by black grama (*Bouteloua eriopoda*) and secondarily bush muhly (*Muhlenbergia porteri*). Creosotebush (*Larrea tridentata*) and tarbush (*Flourensia cernua*) are present and annuals are important components. Loss of grasses due to overgrazing and/or drought, or due to climate change, may lead to a transition to dominance by shrubs. In other cases, shrubs may not increase and the community is dominated by threeawns (*Aristida* spp.) and fluffgrass (*Dasyochloa pulchella*). Persistent reductions of grass permits wind erosion, leading to loss of soil fertility, eventual loss of the A horizon, and exposure of the calcic horizon at which point only a few shrubs and annuals may persist.

No studies have been conducted on the ecology of the limy ecological site.



1a. Overgrazing, soil fertility loss, erosion; 1b. Soil stabilization, seeding, soil modification.
2a. Shrub encroachment due to overgrazing or other factors; 2b. Shrub removal, restore cover
3a. Shrub encroachment; 3b. Shrub removal
4. Loss of perennial grasses due to drought, overgrazing, continued erosion
5a. Continued erosion, overgrazing, drought. 6. Soil addition, seeding.

Shrubland

• Creosotebush, a few bush muhly plants
• Pedestalling (especially bush muhly in interspaces)and other signs of erosion
• Masonfort series, Dona Ana Co.

Plant Community Name: Historic Climax Plant Community

Plant Community Sequence Number: 1 Narrative Label: HCPC

Plant Community Narrative:

State Containing Historic Climax Plant Community
Black grama-dominated state: The historic plant community is believed to have been dominated by black grama, bush muhly, threeawns, burrograss (*Scleropogon brevifolius*) and sand dropseed (*Sporobolus cryptandrus*). Annuals are especially dominant at certain times depending on rainfall. Creosotebush, mormon tea (*Ephedra* spp.), and tarbush are present. Grazing-induced change from this community would be characterized by a reduction in the cover of black grama, bush muhly and dropseeds, and an increase in the proportional representation of threeawns, fluffgrass, shrubs, and annuals.

Diagnosis: Black grama is dominant and the density of shrubs is low. Evidence of erosion is infrequent.

Ground Cover (Average Percent of Surface Area).	
Grasses & Forbs	15
Bare ground	67
Surface gravel	5
Surface cobble and stone	0
Litter (percent)	3
Litter (average depth in cm.)	2

Plant Community Annual Production (by plant type):

	Annual Production (lbs/ac)		
Plant Type	Low	RV	High
Grass/Grasslike	142	275	408
Forb	26	51	75
Tree/Shrub/Vine	32	62	92
Lichen			
Moss			
Microbiotic Crusts			
Totals	200	388	575

Black Grama Dominated State: Plant species are grouped by annual production **not** by functional groups.

Group	Grass/Grasslike Common Name	Scientific Name	Annual Production in Pounds Per Acre Low	High
1	black grama	*Bouteloua eriopoda*	116	155
2	bush muhly	*Muhlenbergia porteri*	19	39
3	sand dropseed	*Sporobolus cryptandrus*	12	31
4	cane bluestem Arizona cottontop plains bristlegrass	*Bothriochloa barbinodis* *Digitaria californica* *Setaria vulpiseta*	4	19
5	tobosagrass	*Pleuraphis mutica*	4	19
6	threeawn burrograss	*Aristida* *Scleropogon brevifolius*	19	39
7	fluffgrass	*Dasyochloa pulchella*	4	19
8	Grass, annual		4	12
9	Grass, perennial		4	12

Group	Shrub/Vine Common Name	Scientific Name	Annual Production in Pounds Per Acre Low	High
10	American tarbush creosote bush	*Flourensia cernua* *Larrea tridentata*	4	19
11	crown of thorns	*Koeberlinia spinosa*	4	12
12	range ratany mariola	*Krameria erecta* *Parthenium incanum*	4	12
13	soaptree yucca	*Yucca elata*	4	12
14	fourwing saltbush	*Atriplex canescens*	4	12
15	Ephedra spp. broom snakeweed	*Ephedra* *Gutierrezia sarothrae*	4	12
16	winterfat	*Krascheninnikovia lanata*	4	12

Group	Forb Common Name	Scientific Name	Annual Production in Pounds Per Acre Low	High
17	desert holly croton spectacle pod buckwheat whitestem paperflower Russian thistle	*Acourtia nana* *Croton* *Dimorphocarpa wislizeni* *Eriogonum* *Psilostrophe cooperi* *Salsola kali*	12	19
18	Forb, annual Forb, perennial		19	39

Plant Growth Curve:
Growth Curve Number: NM2510
Growth Curve Name: Historic Climax Plant Community
Growth Curve Description: SD-2 warm season plant community.

Percent Production by Month

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	5	10	10	25	30	15	5	0	0

Additional States:

Transition to threeawn-fluffgrass state (1a): The cause of this transition is presumably due to poor grazing management or other soil disturbance, possibly in combination with drought. Erosion and degradation of the A horizon may reduce the ability of black grama and bush muhly to establish and spread.

Transition to shrub-dominated state (2a): The cause of this transition is presumably due to poor grazing management that reduces competition of grasses with shrubs, climate change, or perhaps reduced fire frequencies.

Key indicators of approach to transitions: Increases in bare ground, decreases in black grama and bush muhly cover, possibly increased germination of creosotebush (2a).

Threeawn-fluffgrass state: Threeawns, fluffgrass, and annuals dominate in this state. Overall herbaceous cover is low and shrubs are not abundant. It is not understood why shrubs do not come to dominate within this state. Black grama may be eliminated and bush muhly may occur at the bases of shrubs.

Diagnosis: Bare ground is interconnected, and threeawn and other grass cover is patchy or scattered. Fluffgrass may be abundant. Shrubs are present, but are not dominant. Evidence of erosion, including gullies, rills, pedestalling, and water flow patterns may be apparent.

Transition to shrub-dominated state (3a): This may occur if shrub densities increase following the loss of dominant perennial grasses, perhaps due to favorable rainfall patterns.

Key indicators of approach to transitions: Increased germination of creosotebush.

Transition to shrubland/annuals state (5a): The remaining grass patches are lost due to drought and/or disturbance to grasses by grazing or off-road vehicle use. It is possible that most cases of threeawn-fluffgrass states eventually degrade to annual states due to soil burial of grasses, which is caused by wind erosion from large bare patches, in addition to erosion at grass edges.

Key indicators of approach to transitions: Increases in bare ground, evidence of erosion around grass patches and plants (pedestalling), decadence of remaining grasses, decreases in grass cover.

Transition to black grama-dominated state (1b): This might be achieved by nutrient amendments to the soil and/or seeding during periods of above-average summer rainfall. Deferred grazing would probably be necessary.

Shrub-dominated state: This state is characterized by the persistent dominance of creosotebush and other shrubs, including mesquite (*Prosopis glandulosa*). Threeawns may be the grass dominants and black grama and bush muhly are present in some patches. Fluffgrass may be an important component.

Diagnosis: Creosotebush, tarbush, and mesquite are dominant and grass occurrence is patchy. Evidence of erosion, including gullies and rills, are apparent in bare areas.

Transition to shrubland/annual state (4): As for 5a above, except that shrubs persist as the sole perennial dominants.

Key indicators of approach to transitions: Increases in bare ground, evidence of erosion around grass patches and plants (pedestalling), decadence of grasses, decreases in grass cover.

Transition to black grama-dominated state (2b): If competition with shrubs for water and/or nutrients reduces grass dominance in many patches, then shrub control may facilitate black grama and bush muhly reestablishment and vegetative growth. If climatic conditions are not suitable for grass growth then such treatments will be ineffective.

Transition to threeawn-fluffgrass state (3b): Shrub removal may not result in recovery of black grama or bush muhly if moderate soil degradation has occurred, or if seeds of these species are not present. Instead, threeawns may proliferate or simply become the default dominants without increasing in cover.

Shrubland/annuals: Shrubs, especially creosotebush, are dominant perennials and annuals may be periodically abundant. In other cases, shrubs are not abundant. Grasses are rare or absent. Erosion is severe.

Diagnosis: Perennial grasses are rare, shrubs may be the sole perennial cover. Evidence of erosion, especially pedestalling of shrubs and gullies, is apparent throughout the site.

Transition to black-grama-dominated state (6): Shrub removal, the placement of physical structures to collect water or retard erosion, and/or nutrient amendments and seeding may result in recovery of perennial grasses over a period of decades or more. It is possible that only threeawns would recover, in which case the site would recover to the threeawn-fluffgrass state.

Data and information sources and theoretical background: Communities and states are derived largely from Jim Powell, NRCS, retired and infrequent observations by Brandon Bestelmeyer, USDA-ARS Jornada Experimental Range.

Ecological Site Interpretations

Animal Community:

This site provides habitat which support a resident animal community that is characterized by pronghorn antelope, badger, desert pocket mouse, bannertail kangaroo rat, southern plains woodrat, marsh hawk, loggerhead shrike, black-throated sparrow, meadowlark, Texas horned lizard, western hognose snake, couch's spadefoot toad and Woodhouse's toad.

Hydrology Functions:

The runoff curve numbers are determined by field investigations using hydraulic cover conditions and hydrologic soil groups.

Hydrologic Interpretations

Soil Series	Hydrologic Group
Jal	B
Darro	B

Recreational Uses:

Suitability for camping and picnicking is fair, and hunting is fair for pronghorn antelope, quail, dove, and small game. Photography and bird watching can be fair to good, especially during migration seasons. Most small animals of the site are nocturnal and secretive, seen only at night, early morning or evening. Scenic beauty is greatest during spring and sometimes summer months when flowering of forbs and shrubs occurs.

Wood Products:

This site has no significant value for wood products.

Other Products:

This site, at its potential, is suitable for grazing in all seasons of the year, although most of the green forage is produced during summer months. The site is suitable for grazing by all classes of livestock. In order to maintain and improve this site, grazing management that includes a flexible stocking rate is especially important.

Other Information:

Guide to Suggested Initial Stocking Rate Acres per Animal Unit Month

Similarity Index	Ac/AUM
100 - 76	7.0 – 8.0
75 – 51	7.5 – 8.9
50 – 26	8.5 – 13.0
25 – 0	13.0 - +

Plant Preference by Animal Kind:

	Code	Species Preference	Code
Stems	S	None Selected	N/S
Leaves	L	Preferred	P
Flowers	F	Desirable	D
Fruit/Seeds	F/S	Undesirable	U
Entire Plant	EP	Not Consumed	NC
Underground Parts	UP	Emergency	E
		Toxic	T

Animal Kind: Livestock

Animal Type: Cattle

Common Name	Scientific Name	Plant Part	Forage Preferences											
			J	F	M	A	M	J	J	A	S	O	N	D
black grama	Bouteloua eriopoda	EP	P	P	P	D	D	D	D	D	D	D	P	P
bush muhly	Muhlenbergia porteri	EP	P	P	P	P	P	P	P	P	P	P	P	P
plains bristlegrass	Setaria vulpiseta	EP	D	D	D	D	D	P	P	P	P	D	D	D
sand dropseed	*Sporobolus cryptandrus*	EP	U	U	U	D	D	D	D	D	D	U	U	U
tobosa	Pleuraphis mutica	EP	N/S	N/S	D	D	D	P	P	P	D	D	D	N/S
winterfat	Krascheninnikovia lanata	P	P	P	P	P	P	D	D	D	D	P	P	P
fourwing saltbush	Atriplex canescens	EP	P	P	P	P	P	D	D	D	D	D	P	P
soaptree yucca	*Yucca elata*	F	N/S	N/S	N/S	N/S	P	P	N/S	N/S	N/S	N/S	N/S	N/S

Supporting Information

Associated Sites:

Site Name	Site ID	Site Narrative

Similiar Sites:

Site Name	Site ID	Site Narrative

State Correlation:
This site has been correlated with the following states: Texas

Inventory Data References:

Data Source	Number of Records	Sample Period	State	County

Type Locality:

Relationship to Other Established Classifications:

Other References:
Data collection for this site was done in conjunction with the progressive soil surveys within the Southern Desertic Basins, Plains and Mountains, Major Land Resource Areas of New Mexico. This site has been mapped and correlated with soils in the following soil surveys. Sierra County Dona Ana County Grant County Hidalgo County Luna County Otero County

Characteristic Soils Are:	
Jal fine sandy loam	
Karro loam and silty clay loam, fine sandy loam	

Other Soils included are:	

Site Description Approval:

Author	Date	Approval	Date
Don Sylvester	07/12/1979	Don Sylvester	07/12/1979

Site Description Revision:

Author	Date	Approval	Date
Dr. Brandon Bestelmeyer	02/27/03	George Chavez	04/02/03
George Chavez			